

59 read on the elected species. Claims 1-13, 15-30 and 34-59 are generic to the elected species, and claim 14 recites the elected species in a Markush group.

In response to the second species requirement, applicants designate applying an electric current as a method for removing the fixture bridges. Claims 1-3, 11-37 and 43-59 read on the elected species.

B. Remarks

Applicants traverse the imposition of a Restriction Requirement. The reason stated for supporting the requirement for restriction is that the claims are related as combination and subcombination. Applicants submit that it would be more burdensome for the Patent Office to examine the alleged subcombination claims separately from the combination claims. Furthermore, one search of the art should reveal art, to the extent there is any such art, that is pertinent to the patentability of all claims presented in the present application.

C. Requested Amendments

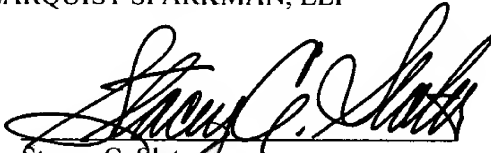
Applicants have requested certain claim amendments to place the claims in better condition for examination. Specifically, applicants have requested amendments to correct an apparent misnumbering of claims (no claim 29 was initially presented), to provide proper dependency for claim 34, and to place the claims in better condition for examination. No new matter has been added to the application by applicants' requested amendments, and hence such amendments should be entered before the application is examined substantively.

The Examiner is invited to call the undersigned to address any questions that may arise concerning this application.

Respectfully submitted,

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Marked-up Version of Amended Claims Pursuant to 37 C.F.R. §§ 1.121(b)-(c)

[30] 29. (Once amended) The method according to claim 28 where the structure and substructure were formed by laser micromachining, photochemical micromachining, electrochemical micromachining, or combinations of these methods.

[31] 30. (Once amended) The method according to claim [28] 29 where bonding comprises microprojection welding.

[32] 31. (Once amended) The method according to claim [28] 29 where bonding comprises diffusion soldering.

[33] 32. (Once amended) The method according to claim 31 where diffusion soldering comprises using layers comprising copper, silver, tin, indium and combinations and mixtures thereof.

[34] 33. (Once amended) The method according to claim 28 where eliminating at least one fixture bridge comprises applying an electric current across the bridge.

[35] 34. (Once amended) A method for making an array of devices, comprising:
providing plural laminae where at least one of the plural lamina has an array of at least two assemblies, each assembly in the array comprising at least one structure, at least one substructure, and at least one fixture bridge, such that at least one of the structures and at least one of the substructures define a space therebetween, and at least one substructure is coupled to at least one structure by at least one fixture bridge across the space; and

dissociating at least one substructure from the structure to which it is coupled by eliminating the fixture bridge, thereby making an array of devices.

[36] 35. (Once amended) The method according to claim [35] 34 where at least one of the assemblies includes plural substructures and at least one substructure is coupled to at least one other substructure by at least one fixture bridge.

[37] 36. (Once amended) The method according to claim [35] 34 [whereby] where dissociating each substructure from its coupled structure by eliminating the fixture bridge comprises applying an electrical current across the fixture bridge sufficient to eliminate the fixture bridge.

[38] 37. (Once amended) The method according to claim [35] 34 [whereby] where dissociating each substructure from its coupled structure by eliminating the fixture bridge comprises:

heating the fixture bridge; and
selectively chemically eliminating the fixture bridge.

[39] 38. (Once amended) The method according to claim [38] 37 [whereby] where at least one fixture bridge is heated to a temperature sufficient to allow the chemical to selectively dissolve the fixture bridge.

[40] 39. (Once amended) The method according to claim [38] 37 [whereby] where a chemical is provided at a concentration, pH, and temperature sufficient to selectively dissolve at least one of the fixture bridges.

[41] 40. (Once amended) The method according to claim [40] 39 where the chemical is selected from the group consisting of acids, bases, oxidizing agents, and mixtures thereof.

[42] 41. (Once amended) The method according to claim [38] 37 where heating the fixture bridge comprises applying an electrical current across the fixture bridge.

[43] 42. (Once amended) The method according to claim [35] 34 [whereby the manner of] where dissociating the substructures from structures by eliminating fixture bridges comprises:

placing an electrode on each substructure to be dissociated;
contacting the structure, coupled to the substructure with a second electrode; and
applying a current through the electrodes.

[44] 43. (Once amended) The method according to claim [35] 34 further comprising:
registering the plural laminae; and

bonding the plural laminae one to another to form an array of monolithic devices.

[45] 44. (Once amended) The method according to claim [44] 43 [whereby] where the manner of bonding the plural laminae one to another to form an array of monolithic devices is selected from the group consisting of diffusion soldering, diffusion bonding, thermal brazing, adhesive bonding, thermal adhesive bonding, curative adhesive bonding, electrostatic bonding, microprojection welding, resistance welding, and [mixtures] combinations thereof.

[46] 45. (Once amended) The method according to claim [40] 39 [whereby] where dissociating each substructure from the structure to which it is coupled by eliminating the fixture [bridge(s)] bridge is performed after the plural laminae are registered and bonded.

[47] 46. (Once amended) The method according to claim [35] 34 [whereby] where dissociating [each] a substructure from the structure to which it is coupled by eliminating the fixture bridge(s) is performed before the plural laminae are registered and bonded.

[48] 47. (Once amended) The method according to claim [47] 46 further comprising:
filling the space between each structure and its coupled substructure with a fixative prior to eliminating the fixture bridge;
eliminating the fixture bridge; and
eliminating the fixative.

[49] 48. (Once amended) The method according to claim [48] 47 [wherein] where the fixative is wax.

[50] 49. (Once amended) The method according to claim [48] 47 [whereby] where the fixative is eliminated by heating.

[51] 50. (Once amended) The method according to claim [35] 34 [whereby] where the manner of forming the plural laminae is selected from the group consisting of additive freeform fabrication, rapid prototyping, microlamination, metal microlamination, and micromechanical fabrication.

[52] 51. (Once amended) The method according to claim [35] 34 [whereby] where the manner of forming the array of structures and coupled substructures is selected from the group consisting of micromachining, laser photoablation, chemical micromachining, electrochemical micromachining, and through-mask electrochemical micromachining.

[53] 52. (Once amended) The method according to claim [35] 34 [whereby] where forming the array of structures and coupled substructures includes lamina preparation.

[54] 53. (Once amended) The method according to claim [53] 52 [whereby] where the manner of lamina preparation is selected from the group consisting of chemical etching, acid etching, electropolishing, oxide-free coating, and mixtures thereof.

[55] 54. (Once amended) The method according to claim [35] 34 [wherein] where at least one of the lamina is made from a material selected from the group consisting of metals, polymers, ceramics, composites, stainless steel, carbon steel, phosphor bronze, metal alloys, and mixtures thereof.

[56] 55. (Once amended) The method according to claim [35] 34 where the device is selected from the group consisting of micromechanical systems, microelectromechanical systems, miniature energy and chemical systems, microthermal systems, microthermomechanical systems, cryocoolers, Stirling cycle cryocoolers, heat pumps, compressors, thermal compressors, refrigerators, heat engines, valves, nozzled valves, ink jet print head valves, fuel cells, fuel combustors, fuel processors, and systems comprising one or more of these devices.

[57] 56. (Once amended) The method according to claim [35] 34 where the device includes at least one high-aspect-ratio microchannel with a ratio of height-to-width of [about] at least 20:1.

[58] 57. (Once amended) The method according to claim [35] 34 where the size of the device is microscale.

[59] 58. (Once amended) The method according to claim [35] 34 where the size of the device is meso-scale.

[60] 59. (Once amended) A method for welding laminae, comprising:
providing at least one lamina with at least one projection, made of a material suitable for welding;
placing the laminae in contact with at least one other lamina at the site of the projection; and
applying a current through the projection sufficient to weld the laminae one to another, thereby
making the device.

[61] 60. (Once amended) The method of claim [60] 59 where the current is applied through plate
electrodes.

[62] 61. (Once amended) The method according to claim [60] 59 where the material suitable for
welding is selected from the group comprising mild steel, carbon steel, low carbon steel, weldable
stainless steel, gold, copper, and mixtures thereof.

[63] 62. (Once amended) A method for bonding laminae having microstructures thereon,
comprising:
providing plural laminae;
registering the laminae;
diffusion soldering the laminae one to another at a temperature and pressure that do not form
soldering flash that restricts flow in or through features.

[64] 63. (Once amended) The method according to claim [64] 62 where the pressure is from
about 2 Mpa to about 5 Mpa.

[65] 64. (Once amended) A method for making a device, comprising:
providing plural laminae, at least one of which is a patterned intermetallic;
registering a stack of the plural laminae including at least one patterned intermetallic;
bonding the stack to form a bonded stack; and
making a device from the bonded stack.